REMARKS/ARGUMENTS

Examiner:

1. **Claims 1, 2, and 6-9 are rejected under 35 U.S.C 102(e) as being anticipated by Nozoe et al. (US Pat. 6777677 B2).**

Nozoe et al. discloses a method of defect root cause analysis comprising: providing a sample with a plurality of defects; performing a voltage contrast to identify locations of the defects; cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample; utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample; performing a mapping analysis according to a result of the chemical state analysis and judging a root cause of the defect generation according to a result of the mapping analysis. Nozoe et al. also discloses that the method utilizes an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample.

Response:

In contrast to Nozoe et al, the claimed invention discloses a mapping analysis, in which the mapping analysis will generate the composition of the defect and the location of the defect into patterns. By comparing the patterns produced by the mapping analysis with the patterns of the original wafer (refers to patterns generated from different photolithography processes), users are able to determine the classification of the defect as well as the root cause of the defect according to the result of the patterns. For instance, as shown in Fig.4 of the claimed invention, the defect of the tungsten conductive line 264 can be observed by utilizing the mapping analysis. As a result, users are able to determine that the root cause of the defect is due to the polymer residue in the previous etching process despite the fact that the defects occur in the next process.

In contrast to the claimed invention, Nozoe et al. principally suggests numerous

applications regarding SEM reviews, which include voltage contrast, figure review, and roughness review. For instance, in column 10, lines 5-33, Nozoe et al. suggests that the in-line inspection system 1 will collect data from the inspection system 2, analysis system 4, and tester system 5 to estimate the yield of the product. Despite the fact that the focused ion beam (FIB) system (12) and AES analysis system (14) are addressed to obtain more detailed analysis of the defect, Nozoe et al. also suggests that the two methods will destroy the wafer to be analyzed and the analysis will unavoidably take longer time. Most importantly, Nozoe et al. never teaches the method of conducting the mapping analysis for tracing the root cause of the defect, as disclosed in the claimed invention.

Additionally, the alignment process disclosed by Nozoe et al. in column 12, lines 31-35 is significantly different from the mapping analysis of the claimed invention, in which the electron beam image 76 utilized in the alignment process essentially refers to an alignment mark on a wafer, which can be utilized to adjust the location of the wafer. Once more, the mapping analysis of the claimed invention has not been disclosed in this paragraph.

According to Chapter 2112 in the MPEP, in relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. Since the inherency of a defect root cause analysis does not flow from the teachings of Nozoe et al, the claims 1,2 and 6-9 should be novel based on the above analysis. Reconsideration of the amended claims 1,2 and 6-9 is politely requested.

2. Claims 3-5 are rejected under 35 U.S.C 103(a) as being anticipated by Nozoe et al. (US Pat. 6777677 B2) in view of Moore et al. (US Pat. 6777674 B2).

Moore et al. discloses that Auger analysis can be employed to provide phase information on chemical bonding of elements, which implies that the particles are not single-phase particles since the analysis is needed to determine the phase information. Moore et al.

further teaches that the analysis is advantageous for small diameter particles with respect to surface sample analysis. Additionally, Moore et al. discloses an interchangeability between Auger and EDS techniques and further teaches that EDS is beneficial for application with respect to relatively heavier particles than those for which Auger analysis would be beneficially.

Response:

In contrast to the claimed invention, Moore et al. discloses a method for analyzing the composition of a microscopic particle resting on a first sample surface, in which the method includes positioning a micro-manipulator probe near the particle, attaching the particle to the prove, moving the probe and the attached particle away from the first sample surface, adjusting the DC potentials between the probe, the particle, and the sample surfaces, and analyzing the composition of the particle by Auger or EDS analysis. However, Moore et al. never teaches the method of utilizing a mapping analysis to trace the root cause of the defect, as disclosed in the claimed invention.

Since Moore et al. never suggests a method of defect root cause analysis including performing a mapping analysis according to the result of the chemical state analysis, claims 3-5 should be non-obvious. Moreover, as claims 3-5 are dependent upon claim 1, claims 3-5 should be allowed if claim 1 is allowed. Reconsideration of claims 3-5 is politely requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)